

IN THE CLAIMS

1. (Original) An apparatus adapted for *in vitro* conditioning of cells prior to administration of the cells into tissue in a cell therapy, the apparatus comprising:

 a culturing module to host the cells and a culturing medium;

 a cardiac electrical stimulator coupled to the culturing module;

 a myocardial stress simulator coupled to the culturing module;

 a biological treatment administration module coupled to the culturing module; and

 a controller coupled to the cardiac electrical stimulator, the myocardial stress simulator, and the biological treatment administration module, the controller adapted to control a delivery of one or more stimuli from one or more of the cardiac electrical stimulator, the myocardial stress simulator, and the biological treatment administration module.

2. (Original) The apparatus of claim 1, further comprising two or more electrodes, connected to the cardiac electrical stimulator and disposed in the culturing medium, to allow delivery of at least one electrical stimulus to the cells.

3. (Original) The apparatus of claim 2, wherein the electrical stimulator comprises a pacemaker.

4. (Original) The apparatus of claim 3, wherein the cardiac electrical stimulator comprises an electric field generator.

5. (Original) The apparatus of claim 1, wherein the culturing module comprises a deformable culturing substrate allowing the cells to be plated thereon.

6. (Original) The apparatus of claim 5, wherein the deformable culturing substrate is made of silicone.

7. (Original) The apparatus of claim 6, wherein the myocardial stress simulator comprises a variable speed motor and a mechanical linkage coupled between the variable speed motor and the deformable culturing substrate, the variable speed motor and the mechanical linkage adapted to create a calibrated cyclic mechanical tension upon the deformable culturing substrate.

8. (Original) The apparatus of claim 1, wherein the biological treatment administration module comprises one or more chemical dispensers adapted to release one or more biological stimulation agents into the culturing medium.

9. (Original) The apparatus of claim 8, wherein the culturing module comprises a mixer adapted to create and maintain a homogeneous culturing medium.

10. (Original) The apparatus of claim 1, further comprising a user interface coupled to the controller, the user interface including a use input accepting commands.

11. (Original) The apparatus of claim 10, wherein the controller comprises a memory circuit storing an instruction for an automated delivery of a sequence of one or more of electrical, mechanical, and biological stimuli.

12. (Original) The apparatus of claim 11, wherein the user interface comprises a display screen.

13. (Original) The apparatus of claim 12, further comprising a monitor coupled to the culturing module, the monitor adapted for observation of the cells in the culturing module.

14. (Original) The apparatus of claim 13, wherein the monitor comprises a microscope, coupled to the controller and the user interface, to allow observation of the cells on the display screen.

15-69. (Canceled)

70. (New) The system of claim 1, wherein the cardiac electrical stimulator is adapted to create cardiac electrical conditions in the culturing medium, the cardiac electrical conditions simulating electrical conditions in myocardium which result in contraction of a heart.

71. (New) The system of claim 1, wherein the mechanical stress stimulator is adapted to create a mechanical stress in the cells hosted in the culturing medium, the mechanical stress simulating a tension applied upon cardiac muscle cells in myocardium.

72. (New) The system of claim 1, further comprising a memory circuit storing an instruction set defining a predetermined sequence of one or more of electrical, mechanical, and biological stimuli, and wherein the controller is adapted to control the delivery of the one or more stimuli from the one or more of the cardiac electrical stimulator, the myocardial stress simulator, and the biological treatment administration module by automatically executing the instruction set.

73. (New) The system of claim 72, wherein the controller is adapted to allow adjustment of parameters in the instruction set during the *in vitro* conditioning of the cells.

74. (New) The system of claim 7, wherein the mechanical linkage is adapted to allow the culturing substrate to be stretched and relaxed in two or more directions without vibration and hesitation.

75. (New) The system of claim 1, wherein the biological treatment administration module comprises an array of dispensers each adapted for release of a predetermined amount of one or more of chemical and biological agents into the culturing medium.